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(71) Applicant: **NIPPON TELEGR & TELEPH CORP <NTT>**

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(54) ETCHING METHOD

(57) Abstract:

PURPOSE: To accurately miniaturize by mounting an etching mask on a substrate, supplying etching reaction gas, and irradiating the surface of the substrate with soft X-rays or vacuum ultraviolet rays, thereby etching the irradiated part of the substrate.

CONSTITUTION: An optical system 3 for introducing a radiated light L of soft X-rays or vacuum ultraviolet rays from an electron synchrotron light radiating device 1 into a reaction chamber 4 is composed of two planar reflection mirrors 3A, 3B. The material of a substrate 6 to be etched with the light L is made of SiO2, Si3N4 or polysilicon added in high concentration with phosphorus or boron. Etching reaction gas G includes small amount of oxygen to be added fluorine and chlorine series etching gas such as SF6, CF4, SiF4, CCl4, Cl2, XeF2, etc. Thus, since the etching for a thin filmlike etching mask 7 made of a material of semiconductor of Si, Ge or metal and their polycrystal scarcely advances even under the irradiation of reaction gas, microminiaturization of 0.1μm or less can be performed.